IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor	: Hui Su	
Appln. No.	: 10/071,018	
Filed	: February 7, 2002	Group Art Unit: 2133
For	: DATA SECTOR ERROR TRACKING AND CORRECTION MECHANISM	Examiner: J. Torres
Docket No.	: S01.12-0869	

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION - 37 C.F.R. §41.37)

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA FACSIMILE:
703-872-9306

Sir:

Transmitted herewith is an Appeal Brief in this application with respect to the Notice of Appeal filed on March 1, 2005 and in response to the Notification of Non-Compliant Appeal Brief mailed on June 22, 2005.

FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. §41.20(b)(2) the fee for filing the Appeal Brief is $500.00, which was previously submitted on May 2, 2005.

The Director is authorized to charge any additional fees associated with this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: _____
Todd R. Fronek, Reg. No. 48,516
Suite 1600 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

TRF:dkm

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

First Named Inventor	: Hui Su	
Appln. No.	: 10/071,018	
Filed	: February 7, 2002	Group Art Unit: 2133
For	: DATA SECTOR ERROR TRACKING AND CORRECTION MECHANISM	Examiner: J. Torres
Docket No.	: S01.12-0869	

CERTIFICATION OF TELEFACSIMILE TRANSMISSION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

VIA FACSIMILE:
703-872-9306

Sir:

I certify that the following papers are being telefacsimile transmitted to the U.S. Patent and Trademark Office on the date shown below:

1. Transmittal of Appeal Brief (1 page);
2. Brief For Appellant (12 pages).

WESTMAN, CHAMPLIN & KELLY, P.A.

Date: 7/6/05

By: _____
Todd R. Fronek, Reg. No. 48,516
Suite 1400 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

TRF:dkm

14 PAGES - INCLUDING COVER PAGE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

First Named Inventor :	Hui Su	Appeal No.
Appln. No.:	10/071,018	
Filed :	February 7, 2002	Group Art Unit: 2133
For :	DATA SECTOR ERROR TRACKING AND CORRECTION MECHANISM	Examiner: J. Torres
Docket No.:	SO1.12-0869	

BRIEF FOR APPELLANT

VIA FACSIMILE;
703-872-9306

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

This is an appeal from an Office Action dated December 1, 2004 in which claims 1-20 were finally rejected.

REAL PARTY IN INTEREST

Seagate Technology LLC, a corporation organized under the laws of the state of Delaware, and having offices at 920 Disc Drive, Scotts Valley, CA 95066, has acquired the entire right, title and interest in and to the invention, the application, and any and all patents to be obtained therefor, as set forth in the Assignment filed with the patent application and recorded on Reel 012577, frame 0105.

RELATED APPEALS AND INTERFERENCES

There are no known related appeals or interferences, which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

STATUS OF THE CLAIMS

This status of the claims is prepared pursuant to the

Amendment After Final filed on June 13, 2005 in accordance with 37 CFR 41.33(b).

I. Total number of claims in the application.

Claims in the application are: 1-20

II. Status of all the claims.

A. Claims cancelled: 3-4, 12-13 and 18-20

B. Claims withdrawn but not cancelled: none

C. Claims pending: 1-20

D. Claims allowed: none

E. Claims rejected: 1-20

G. Claim allowable none

III. Claims on appeal

The claims on appeal are: 1,2,5-11,and 14-17

STATUS OF AMENDMENTS

An Amendment After Final was mailed February 1, 2004 wherein amendments were made to claims 1 and 10 pertaining to subject matter previously presented in dependent claims 3, 4 and 12. Subsequently, claims 3, 4, and 12 were cancelled and claims 5, 13 and 14 were amended to correct dependency issues. Furthermore, claims 18-20 were cancelled. In the Advisory Action mailed February 23, 2005, the Examiner indicated that the proposed amendments would not be entered because they raise new issues that would require further consideration and/or search.

Applicants have submitted an Amendment After Final on May 2, 2005 that includes similar amendments contained in the Amendment After Final mailed February 1, 2005. However, slight changes have been made to conform with the reasons for non-entry stated in the advisory action. In particular, the limitations added to claims 1 and 10 are such that they more closely resemble language previously recited in claims that have been considered and conform to the requirements of 37 CFR 41.33. This Amendment After Final was not entered in the case as indicated in an

Advisory Action mailed on June 7, 2005.

Applicants filed a further Amendment After Final on June 13, 2005 in response to the Advisory Action mailed on June 7, 2005. The Amendment After Final filed on June 13, 2005 adopted the suggestions of the June 7, 2005 Advisory Action.

SUMMARY OF CLAIMED SUBJECT MATTER

Independent claim 1 recites a method in a data storage system 100. The data storage system 100 includes a storage medium 105 having a plurality of tracks, each track having a plurality of sectors. Step 402 determines a number of sectors to be read from the storage medium. The method 400 also includes step 404 wherein data is read from all sectors of the number of sectors during a first operation. Error sectors are identified that have a number of errors above a predetermined threshold at step 406. A signal is provided for each error sector indicative of whether each sector is an error sector or a non-error sector. A mask 158 is generated based on the signals. Next, data from the error sectors is corrected at step 410. During a second operation, corrected data is written back to only the error sectors based on the signals for each sector indicative of whether each sector is an error sector or not. Method 400 is further described in Applicant's specification from page 9, line 16 to page 10, line 9.

Independent claim 10 recites a data storage system 100. The system 100 includes a storage medium 105 having a plurality of tracks, each track having a plurality of sectors. The system 100 also has a buffer memory 142, a channel configured to read data from and write data to the storage medium and a controller 129 operably coupled to the channel 105. The controller 129 is configured to determine a number of sectors to be read and read all sectors of the number of sectors during a first operation. The controller is also configured to identify error sectors having a number of errors above a predetermined threshold and

generate a mask containing signals for the number of sectors based on whether each sector is an error sector or a non-error sector. Further, the controller 129 is configured to correct data from the error sectors and selectively read data from and write corrected data to the error sectors during a second operation.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1, 2, 5-11 and 14-17 stand rejected under 35 USC 103(a) as being unpatentable over Iwamura (U.S. Patent No. 5,677,901) in view of Satoh et al. (U.S. Patent No. 5,469,418, hereinafter "Satoh").

ARGUMENT

I. DISCUSSION OF PRIOR ART REFERENCES

A. Iwamura

Iwamura relates to methods for reproducing and decoding data recorded on an optical disc in which an entire track of data is copied into a buffer. The entire track of data is then read out of the buffer, processed using an error correction code and copied back into the buffer. The data is then read from the buffer for decoding.

Iwamura does not teach or suggest tracking errors sectors or writing corrected data back to only the error sectors. Instead error correction is done on a track by track basis. As a result, data in non-error sectors is also read, corrected, and written back into the buffer. Hence, non-error sectors may become error sectors due to errors that can occur as the non-error sector data is written back to the buffer.

B. Satoh

Satoh describes a method of writing data to an optical

disc. While Satoh discusses error tracking and correction, it appears that, at times, Satoh appears to interchange the terms "sector" and "track". For example, Satoh provides that "sector alternate processing is performed (Step S49) to write the data of the defective track again from the memory of 14A in a spare sector". (emphasis added, col. 6, ll. 20-22). As can best be gleaned, the Satoh reference teaches writing and reading data on a track by track basis (col. 4, ln. 40 - col. 5, ln. 21). One track is read or written in a revolution of the disc. During a write verify mode, in which one track is read each revolution, errors are tracked and it is determined whether the number of errors is larger than a predetermined number. It is unclear what portion of the disk is used to determine what error rate (i.e. track or sector) is used to calculate if the predetermined number has been exceeded.

In the write operation discussed from col. 3, l. 49 to col. 4, l. 16, a number of sectors are written to an optical disc in a single operation. Then, all of the sectors are read using the read operation and it is determined whether a number of errors is above a particular threshold. As described, the entire write operation (which includes a number of sectors) is evaluated based on the number of errors in the entire write operation. For example, Satoh describes, "If the number of error bytes is smaller than the prescribed standard, it is determined that the *write operation* has been correctly performed, and otherwise it is determined that the *write operation* was not correctly performed..." (emphasis added). The write operation includes a prescribed number of sectors. The Office Action contends that the above description of Satoh provides that error sectors having a number of errors above a threshold are identified. However, from the discussion above, Applicants contend that Satoh is unclear on whether the errors are identified on a sector-by-sector basis.

Further, Satoh describes that defective tracks are

rewritten to spare sectors of the disk (col. 6, ln. 14-22). Thus, Satoh makes no reference to identifying error sectors in a track or error sectors from a number of sectors. Furthermore, there is no reference to writing corrected data to the defective track or sector. In contrast, data is written elsewhere (i.e. a spare sector) and thus Satoh does not teach or suggest writing corrected data to the error sector.

II. CLAIMS 1, 2, AND 5-9 ARE PATENTABLE OVER IWAMURA IN VIEW OF SATOH.

A. Independent Claim 1

Amended claim 1 recites, in part, a method that includes reading data from a number of sectors during a first operation, identifying error sectors having a number of errors above a predetermined threshold, providing a signal for each sector indicative of whether each sector is an error sector or a non-error sector, generating a mask based on the signals, correcting the error sectors, and writing corrected data to only the error sectors based on the signals during a second operation. By writing data to only the error sectors, processing time is reduced and generation of errors in non-error sectors is avoided.

Applicants respectfully submit that combining Iwamura and Satoh would not achieve the method of claim 1. As mentioned above, Iwamura does not teach identifying error sectors having a number of errors above a predetermined threshold. The method of operation in Iwamura is completely different from the method of claim 1. Data is read from a disc and stored in a buffer, which is corrected and stored before being decoded to produce a less complex decoding technique. In Iwamura, entire tracks of data are read, corrected, and re-written based on a size of a buffer, with no reference, description or suggestion to correcting individual sectors. Furthermore, Satoh is unclear as to how errors are

identified and corrected. Tracks of data that are found to have a number of errors above a threshold level are re-written into an alternate portion of the disc. As a result, the combination of Satoh and Iwamura does not teach or suggest a method for identifying, reading from, correcting, and writing data to error sectors rather than tracks as a whole. Notwithstanding, even if error sectors within a given track are identified in Satoh, the combination does not teach or suggest writing corrected data back to only the error sectors as recited in claim 1. Iwamura describes error correcting on a track-by-track basis and writing an entire track to a buffer, which simply does not suggest writing data to only error sectors. Additionally, Satoh performs an entire second write operation to a spare portion of a medium if a first write operation is not satisfactory. Thus, neither Iwamura or Satoh teach or suggest writing to only error sectors.

The Office Action asserts that Satoh substantially describes a masking means. However, no such description of a masking means is provided in Satoh. Additionally, the Office Action does not present any evidence with regards to writing corrected data to only the error sectors. Notwithstanding, Satoh describes writing defective data to *alternate* sectors, not to only the error sectors. Thus, the functionality of Satoh is completely different from the present invention. As discussed above, the invention recited in claim 1 includes writing to only error sectors and reduces processing time and prevents non-error sectors from being re-written with further errors. Alternatively, the combination of Iwamura and Satoh, if able to identify error sectors, would not write data only to the error sectors, as instead the defective tracks would be re-written in alternate portions of the disc.

Based on the above-mentioned reasons, Applicants respectfully submit that claim 1 is neither taught nor suggested by the combination of Iwamura and Satoh. Thus, Applicants'

request that the rejection to claim 1 be withdrawn.

B. **Dependent claims 2 and 5-9**

Applicants respectfully submit that dependent claims 2 and 5-9 are also allowable at least based on their relationship to independent claim 1. Additionally, Applicants submit that many of the dependent claims are independently patentable. In particular, claim 6 recites a method wherein data is read from only the error sectors during an intermediate operation. Neither Iwamura nor Satoh teach reading data only from the error sectors during an intermediate operation. In accordance, Applicants respectfully submit that the combination of the references does not suggest such an intermediate operation. Applicants therefore request that the rejection to claims 2 and 5-9 be withdrawn.

III. CLAIMS 10, 11, AND 14-17 ARE PATENTABLE OVER IWAMURA IN VIEW OF SATOH.

A. **Independent claim 10**

Amended claim 10 recites, in part, a controller configured to read a number of sectors of a storage medium during a first operation, identify error sectors having a number of errors above a predetermined threshold, generate a mask containing signals for the number of sectors based on whether each sector is an error sector or a non-error sectors, correct data from the error sectors, and selectively read data from and write data to only the error sectors based on the mask during a second operation.

As mentioned above, the combination of Iwamura and Satoh does not teach or suggest writing corrected data back to only the error sectors. Additionally, neither Iwamura nor Satoh teach or suggest generating a mask or correcting data and writing data to a storage medium based on a mask. Accordingly, Applicants

respectfully submit that claim 10 is neither taught nor suggested by the combination of Iwamura and Satoh and request that the rejection to claim 10 be withdrawn.

B. **Dependent claims 11 and 14-17**

Applicants respectfully submit that dependent claims 13-17 are also allowable at least based on their relationship to independent claim 10. Additionally, Applicants submit that many of the dependent claims are independently patentable. In particular, claim 15 recites a system wherein data is read from only the error sectors during an intermediate operation. As mentioned above with respect to claim 6, neither Iwamura nor Satoh teach reading data only from the error sectors during an intermediate operation. Thus, Applicants' request the rejection to claims 11 and 14-17 be withdrawn.

IV. CONCLUSION

Based on the foregoing, Applicants submit that claims 1, 2, 5-11 and 14-17 are in condition for allowance. Applicants respectfully request reconsideration and allowance of the pending claims.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: _____

Todd R. Fronek, Reg. No. 48,516
Suite 1600 - International Centre
900 Second Avenue South
Minneapolis, Minnesota 55402-3319
Phone: (612) 334-3222 Fax: (612) 334-3312

Appendix A

CLAIMS

1. (Currently amended) A method in a data storage system having a storage medium comprising a plurality of tracks, each track comprising a plurality of sectors, the method comprising:

determining a number of sectors to be read from the storage medium;

reading data from all sectors of the number of sectors during a first operation of the data storage system;

identifying error sectors having a number of errors above a predetermined threshold;

providing a signal for each sector indicative of whether each sector is an error sector or a non-error sector;

generating a mask based on the signals;

correcting the data from the error sectors; and

writing corrected data to only the error sectors based on the signals for each sector indicative of whether each sector is an error sector or a non-error sector during a second operation of the data storage system.

2. (Original) The method of claim 1 wherein the step of identifying includes tracking a number of errors in each sector.

3-4. (Cancelled).

5. (Currently amended) The method of ~~claim 3~~ claim 1, and further comprising storing the mask in a buffer.

6. (Previously Presented) The method of claim 1 and further comprising reading data from only the error sectors during an intermediate operation of the data storage system.

7. (Previously Presented) The method of claim 6 wherein the intermediate operation of the data storage system occurs between the first and second operations of the data storage system.

8. (Original) The method of claim 1 wherein the step of reading data from the error sectors includes storing data in a buffer.

9. (Original) The method of claim 1 wherein the step of correcting includes using error correction code.

10. (Currently Amended) A data storage system, comprising:

a storage medium, the storage medium comprising a plurality of tracks, each track comprising a plurality of sectors;

a buffer memory;

a channel configured to read data from and write data to the storage medium; and

a controller operably coupled to the channel and configured to determine a number of sectors to be read from the storage medium, read all sectors of the number of sectors on the storage medium during a first operation of the data storage system, identify error sectors having a number of errors above a predetermined threshold, generate a mask containing signals for the number of sectors indicative of whether each sector is an error sector or a non-error sector, correct the data from the error sectors and selectively read data from and write corrected data to only the error sectors on the storage medium based on the mask during a second operation of the data storage system.

11. (Previously Presented) The data storage system of claim 10

wherein the controller is further configured to track the number of errors occurring in each sector.

12. (Cancelled)

13. (Cancelled)

14. (Currently amended) The data storage system of ~~claim is~~ claim 10 wherein the mask is stored in the buffer memory.

15. (Previously Presented) The data storage system of claim 10, wherein the storage medium controller is further configured to read data from only the error sectors during an intermediate operation of the data storage system, occurring between the first and second operations of the data storage system.

16. (Previously Presented) The data storage system of claim 10 wherein the controller further comprises an error correction code unit to correct the data from the error sectors.

17. (Previously Presented) The data storage system of claim 10 wherein the controller is further configured to store the data from the error sectors in the buffer memory.

18-20. (Cancelled).